

ORIGINAL

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

In the Matter of: )  
)  
Petition of the Intelligent Transportation )  
Society of America for Amendment of )  
the Commission's Rules to Add Intelligent ) RM-9096  
Transportation Services as a New )  
Mobile Service with Co-Primary Status )  
in the 5.85 to 5.925 GHz Band )

RECEIVED  
SEP 17 1997  
DOCKET FILE COPY ORIGINAL

REPLY COMMENTS

The Intelligent Transportation Society of America ("ITS America"), by its counsel and pursuant to Section 1.415 of the Commission's Rules, hereby submits its Reply to the Comments submitted in the above-captioned proceeding on July 28, 1997.<sup>1</sup> In its May 19, 1997 Petition For Rulemaking, ITS America requested that the FCC commence a rulemaking proceeding to amend Subpart M of Part 90 of its Rules to allocate on a co-primary basis the 5.850-5.925 GHz Band for use by intelligent transportation systems. ITS America noted that the Intermodal Surface Transportation Efficiency Act of 1991 ("ISTEA") established as a national priority the development of a nationwide ITS infrastructure. The ITS National Program Plan and National Architecture identified (Petition at 12-30) a set of existing, emerging and future DSRC services that required a dedicated spectrum allocation to attain a nationwide, interoperable ITS deployment consistent with the mandates of ISTEA. This infrastructure, in turn, will realize

---

<sup>1</sup>The FCC placed ITS America's Petition on Public Notice, DA 97-1106 on May 28, 1997 and established July 28, 1997 as the Comment Date and August 17, 1997 as the Reply Comment Date. Following submission of the Comments on its Petition, ITS America requested that the Commission extend the date for submission of Reply Comments. By its Order on August 8, 1997, the FCC extended the date for submitting Reply Comments in this proceeding until September 17, 1997.

044

enormous public benefits in the improved safety and efficiency of the Nation's transportation infrastructure.

Approximately sixteen parties submitted formal Comments on ITS America's Petition, representing State and local governments,<sup>2</sup> users of existing and planned DSRC products and services<sup>3</sup>, manufacturers and vendors of DSRC readers and tags,<sup>4</sup> U.S. automobile manufacturers,<sup>5</sup> commercial mobile radio service ("CMRS") providers,<sup>6</sup> transportation professionals,<sup>7</sup> potential spectrum neighbors in the 5.85 to 5.925 GHz Band<sup>8</sup> and the United

---

<sup>2</sup>Comments of the American Association of State Highway and Transportation Officials, RM-9096 (July 28, 1997) ("AASHTO Comments"); Comments of the State of Minnesota, RM-9096 (July 28, 1997) ("Minnesota Comments").

<sup>3</sup>Comments of International Bridge, Tunnel and Turnpike Association, RM-9096 (July 28, 1997) ("IBTTA Comments"); Comments of the Management Systems Council of the American Trucking Associations, RM-9096 (July 28, 1997) ("ATA Comments"); Comments of New Jersey Turnpike Authority, RM-9096 (July 28, 1997) ("NJTA Comments"); Comments of MTA Bridges and Tunnels, RM-9096, July 28, 1997 ("MTA Bridges Comments"); Comments of Maryland Transportation Authority, RM-9096 (July 30, 1997) ("MdTA Comments").

<sup>4</sup>Comments of Minnesota Mining and Manufacturing Company, RM-9096 (July 28, 1997) ("3M Comments"); Comments of Mark IV Industries, Ltd., IVHS Division, RM-9096 (July 28, 1997) ("Mark IV Comments"); Comments of Saab Systems, Inc., RM-9096 (July 28, 1997) ("Saab Comments").

<sup>5</sup>Comments of the American Automobile Manufacturers Association, RM-9096 (July 28, 1997) ("AAMA Comments").

<sup>6</sup>Comments of BellSouth Corporation, RM-9096 (July 28, 1997) ("BellSouth Comments").

<sup>7</sup>Comments of the Institute of Transportation Engineers, RM-9096 (July 28, 1997) ("ITE Comments").

<sup>8</sup>Comments of ReSound Corporation, RM-9096 (July 28, 1997); Comments of the American Radio Relay League, Incorporated, RM-9096 (July 28, 1997) ("ARRL Comments").

States Department of Transportation.<sup>9</sup> In addition two parties to date have submitted Reply Comments concerning the potential impact of radiofrequency ("RF") emissions resulting from deployment of DSRC products.<sup>10</sup>

As shown below, the Commentors in this proceeding reflect broad based consensus support by both the private and public sectors for the commencement of a rulemaking by the Commission looking toward the allocation of adequate spectrum for ITS DSRC-based services. These Commentors, indeed, confirm the need for this spectrum allocation and demonstrate the public benefits of increased safety, mobility and efficiency that will arise from this allocation.

I. THE RECORD SUPPORTS A RULEMAKING TO ALLOCATE SPECTRUM FOR ITS SERVICES

A. There Is Broad Recognition of the Benefits of ITS

In its Petition For Rulemaking, ITS America submitted, among other Appendices, the National Program Plan which identified eleven ITS user services that require a short-range vehicle to roadside communications link, including electronic payment services, commercial vehicle electronic clearance, traffic control, incident management, en route driver information, public transportation management, highway rail intersection and future DSRC-based services. ITS America documented extensively the many public benefits that would flow from the allocation of spectrum that would promote a robust, nationwide deployment of DSRC-based ITS

---

<sup>9</sup>Comments of the United States Department of Transportation, RM90-96 (July 28, 1997) ("USDoT Comments").

<sup>10</sup>Reply Comments of the Cellular Phone Taskforce, RM-9096 (August 14, 1997) ("Cell Phone Task Force Reply"); Reply Comments of the Electrical Sensitivity Network, RM-9096 (August 18, 1997) ("ESN Reply").

services. First and foremost among these benefits is increased safety for the traveling public. To this end, 3M states that "DSRC technology will fulfill a vital public safety function... DSRC will save lives and reduce injuries in a way that police and fire departments cannot emulate." 3M Comments at 6. AASHTO echoes this view, stating that "DSRC-based systems can dramatically improve highway safety." AASHTO Comments at 3. AAMA notes its view that "short range communications are necessary to realizing safety, mobility, productivity, and environmental goals sought after under the banner of ITS." AAMA Comments at 1. USDOT notes that "[p]ublic safety and other valuable uses of DSRC technologies demand reliability and national interoperability." USDOT Comments at 5.

ITS America further noted in its Petition that the requested spectrum allocation would help relieve traffic congestion, enhance mobility and economic productivity and improve environmental quality. In its Comments, AASHTO notes that "[T]ravel trends indicate that our transportation system may face substantial challenges unless we take action now...Traffic congestion on urban interstates has ballooned from 41% in 1975 to 69% in 1993, costing our 50 largest urban areas an estimated \$43 billion annually. Traffic congestion also results in the deterioration of our nation's air quality." AASHTO Comments at 2. ITE states that "Gone are the days when a region could increase its transportation capacity exclusively by building a new road or highway. Environmental, societal and economic considerations now face decision-makers to find creative ways to solve capacity and demand problems within the confines of their current transportation systems...ITS presents one of the best alternatives to new highway construction." ITE Comments at 1. The State of Minnesota adds "A designated band for DSRC

use is crucial to the development of ITS systems. DSRC spectrum allocation would allow national standardization of DSRC systems ....” Minnesota Comments at 2.

ITS America agrees with the views expressed by these and other Commentors regarding the public benefits that will flow from the early and robust deployment of an ITS infrastructure which accommodates nationally interoperable DSRC-based services. Indeed, the record in this proceeding is clear and convincing regarding these benefits and provides a sound basis for the FCC to proceed with a Notice of Proposed Rulemaking proposing the requested spectrum allocation in the 5.85 to 5.925 GHz Band.

B. DSRC Does Not Present a Unique RF Hazard

The Cell Phone Task Force and the Electrical Sensitivity Network each requests that the FCC forestall any action proposing a spectrum allocation for DSRC-based ITS services because of the possible impact of RF emissions. Neither party has submitted any technical information unique to operation in the 5.8 GHz Band or to the expected technical parameters of DSRC-based services. The Commission and industry have long been concerned about the potential hazards of RF emissions and have directed much attention and many resources to crafting appropriate regulations and guidelines concerning such emissions. To this end, on August 25, 1997 the Commission released its *Second Memorandum Opinion and Order* in ET Docket 93-62 amending its rules to clarify and refine its regulations regarding the use of new guidelines and methods in the evaluation of the environmental effects of RF electromagnetic fields or emissions produced by FCC-regulated transmitters. The FCC also released at that time

its updated OET Bulletin 65 entitled *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*.<sup>11</sup>

In response to the Reply Comments of the Cell Phone Task Force and ESN, ITS America requested that ARINC review potential DSRC deployments for compliance with the FCC's RF guidelines. A copy of ARINC's Report, which concludes that "[t]he expected deployment of DSRC beacons meets the FCC Guidelines for Human Exposure to radiofrequency Electromagnetic Fields" is appended to these Reply Comments. There is, accordingly, no basis to delay FCC action concerning ITS America's Petition for consideration of an RF emissions issue specific to either DSRC-based systems or the 5.8 GHz Band. Indeed, the public health benefits that will be realized from the use of the requested spectrum to improve traffic safety and reduce traffic-related fatalities and injuries compel prompt action.

C. Collaborative Testing Will Reveal Compatibility of DSRC and Other Uses

In its Petition (at 47-51), ITS America stated its view that DSRC systems will be compatible with existing uses of the spectrum and can operate in the 5.8 GHz Band with minimal interference and indicated its willingness to work with existing spectrum occupants to develop appropriate spectrum sharing protocols. ReSound, which is developing a Part 15 hearing health care product in the 5.85-5.875 GHz Band pursuant to Section 15.249 of the Commission's Rules, indicates that "because no specific design for DSRC systems is contemplated, any current claims regarding non-interference to other uses cannot be tested." ReSound Comments at 6. ARRL also states that the "compatibility between amateur uses of the band on a secondary basis, and the

---

<sup>11</sup>*Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation (Second Memorandum Opinion and Order and Notice of Proposed Rulemaking)*, FCC 97-303 (August 25, 1997).

operation of co-primary ITS DSRC facilities in the same band is as yet unexplored and unknown.” ARRL Comments, Summary at i.

As stated in its Petition, ITS America is committed to facilitating the development of appropriate spectrum sharing protocols with other band occupants. ITS America has held preliminary discussions with both ReSound and ARRL regarding shared band occupancy. ARINC is currently planning to test DSRC equipment at 5.8 GHz to identify particular concerns regarding shared band occupancy and will solicit the participation of ReSound and ARRL. ITS America will keep the Commission informed of the progress of such testing.

D. DSRC Channelization and Service Rules Should Be Explored By NPRM

Finally, several parties have raised issues concerning proposed service and licensing rules to govern any ITS allocation in the 5.8 GHz Band. In supporting the requested spectrum allocation, BellSouth, for example, suggests that a certain amount of any allocation should be reserved for CMRS service offerings. BellSouth Comments at 1. ITS America did not endorse in its Petition the adoption by the FCC of any particular technical approach or channelization plan to govern the proposed spectrum allocation. ITS America noted, moreover, that there are several competing technical solutions to the provision of DSRC-based ITS services. In addition, U.S. activities regarding the development of voluntary standards to govern DSRC activities in the 5.8 GHz band are in preliminary stages. ITS America is committed to participating in these standardization activities and to keeping the FCC advised of their progress but believes that the optimal channelization plan and service rules to govern an allocation in the 5.8 GHz Band should be further explored through a Notice of Proposed Rulemaking. ITS America urges the Commission, however, to recognize in any NPRM that the majority of DSRC-

based ITS services are likely to fall within the definition of public safety service and, thus, be available for licensing to public safety eligibles. In addition, ITS America believes that non-public safety DSRC services are likely to be provided on a site-specific basis that would be more analogous to traditional Part 90 Business Radio type use, rather than Part 22 CMRS type use. ITS America, however, believes that this issue should also be further explored through an NPRM.

## II THE RECORD IN THIS PROCEEDING DEMONSTRATES THE CRITICAL ROLE OF LMS SERVICES IN THE 900 MHz BAND

In its Petition, ITS America acknowledged the significant contributions of existing DSRC-based services provided pursuant to the Location and Monitoring Service (“LMS”) allocation in the 902-928 MHz band (including electronic toll services) in facilitating the timely deployment of ITS services. Indeed, these existing 900 MHz band systems have provided a critical platform for market development and built public awareness and support of ITS. ITS America’s Petition recognized that the spectrum needs for the robust deployment of DSRC-based ITS services forecast by the National Program Plan and planned for by the National Architecture, however, could not be met in the 900 MHz Band. ITS America’s Petition requested no changes to the LMS allocation.

Several Commentors have emphasized the critical role of the 900 MHz LMS systems. Mark IV notes, for example, that approximately 1.5 million users currently use its 900 MHz Band tags on toll systems that serve many significant roadways. Mark IV Comments at 3. Mark IV thus urges as a counterpart to FCC action concerning ITS America’s Petition that the Commission confirm the legitimate expectations of these existing toll systems to continue to

operate (and expand) their 900 MHz Band systems.<sup>12</sup> In addition, Mark IV urges that the Commission preserve the options of toll authorities and other prospective users of DSRC-based ITS services to select that technology which best fits their needs. Id. NJTA, the lead agency of a consortium of toll agencies in New Jersey, New York and Delaware, which has installed over 650 lanes of electronic toll equipment in the 900 MHz Band, supports ITS America's request based upon the FCC providing sufficient time for vendors to develop and manufacture products in the 5.8 GHz Band that meet established quality and reliability standards and sufficient time for the full life cycle depreciation of existing LMS systems in the 900 MHz Band. NJTA Comments at 2.

ITS America concurs with these Commentors regarding the need for the continued and unaltered availability of the 900 MHz Band for LMS systems. These systems will continue to provide many public benefits and build public acceptance for ITS as the Commission and industry pursue the allocation of spectrum in the 5.8 GHz Band. Indeed, following any such allocation, the availability of LMS licenses in the 900 MHz Band will spur competition between equipment vendors and promote user options and service diversity.

In its Comments, Mark IV suggests that DSRC equipment in the 5.8 GHz Band may be more costly and less technically capable than LMS equipment in the 900 MHz Band. Mark IV Comments, Attachment A. ITS America recognizes, of course, that the state of development of RF equipment generally in the lower frequency bands, such as the 900 MHz Band, is more mature, and has thus reached more economies of scale, than the state of

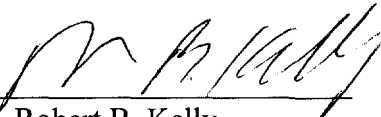
---

<sup>12</sup>Mark IV suggests that the FCC commence an inquiry pursuant to Section 1.430 of the Commission's Rules. Mark IV Comments at 4.

development of RF equipment in higher bands, such as the 5.8 GHz band. ITS America believes, however, that many companies, including some of the Commentors in this proceeding are hard at work in research and development in attempting to reach these economies with RF technologies in the higher frequency bands. Indeed, a proposed allocation of the 5.8 GHz Band to ITS is likely itself to spur further significant investment in the research and development of products in the Band, and to promote both attainment of scale economies and improvement of product performance. To this end, based upon developments in the U.S. (see, e.g., 3M Comments), Europe and Japan regarding products in the range of 5.8 GHz, ITS America believes that there is ample evidence that the technical and cost issues associated with the development and deployment of DSRC products in that Band can and will be solved.

For the reasons discussed in these Reply Comments and in the Petition For Rulemaking, ITS America urges that the FCC promptly commence a rulemaking proceeding to allocate on a co-primary basis the 5.85 to 5.925 GHz Band to ITS services.

Respectfully submitted,  
**ITS America**

  
By: Robert B. Kelly

KELLY & POVICH, P.C.  
Suite 800  
2300 M Street, N.W.  
Washington, D.C. 20037

Its Counsel

September 17, 1997

## **Evaluation of the DSRC System's Compliance with the FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields (OET Bulletin 65)**

The FCC has adopted guidelines and procedures for evaluating the environmental effects of RF emissions. The guidelines include two acceptable levels of human exposure based upon whether the exposure occurs in an occupational (i.e. "controlled") environment or in an environment encountered by the general population (i.e. "uncontrolled" environment). The exposure levels are expressed as Maximum Permissible Exposure (MPE) limits which are derived from exposure criteria, with a safety factor built in, quantified in terms of specific absorption rate for whole-body absorption. Another feature of the exposure guidelines is that it may be averaged over certain periods of time with the average not to exceed the MPE limit. The time interval over which to average is given and can be thought of as a sliding window in which average exposure within the window should never exceed the MPE limit.

The MPE and time averaging intervals for systems in the frequency range of 1500 to 100,000 MHz are given in the following table for the occupational and general population environments. These are the limits which will be required of the DSRC system.

Exposure limits for DSRC System

Environment	Power Density (mW/cm <sup>2</sup> )	Averaging Time (min.)
Occupational	5.0	6
General Population	1.0	30

In order to evaluate the exposure level expected in a typical DSRC scenario, we must use the following equation for calculating power density.

$$S = \text{EIRP} / 4\pi R^2$$

where: S = Power density in appropriate units (e.g. mW/cm<sup>2</sup>, W/m<sup>2</sup>)  
EIRP = Effective isotropic radiated power in appropriate units (e.g. mW, W)  
R = range to exposed body in appropriate units ( e.g. cm, m)

This equation will be used to determine the exposure levels to humans encountering the DSRC system. As long as the exposure limits are within those listed in the above table, the DSRC system is in compliance with the FCC guidelines.

The following assumptions will be made to determine the exposure levels:

- (1) We will assume worst case main beam EIRP for all DSRC transmitters

- (2) The DSRC transmitters will be mounted 15 feet above the ground and therefore a minimum range of 15 feet will be used in the power density equation.
- (3) The reduction of power density levels due to shielding from structures like toll booths will not be considered in the calculations
- (4) Two transmitter EIRP levels will be considered. A typical transmitter is anticipated to have an EIRP of 4 W and a high-powered transmitter is anticipated to have an EIRP of 40 W.

The exposure levels are thus  $1.52 \text{ uW/cm}^2$  for the 4 W transmitter case and  $15.2 \text{ uW/cm}^2$  for the 40 W case. These levels are well below both the occupational and general population MPE limits. Using the equation to solve for the range at which the MPE limit is encountered allows a range of 7.9 cm and 25.2 cm for the two transmitter powers (low power and high power respectively) for the occupational limit and ranges of 17.84 cm and 56.4 cm for the general population. These ranges would most likely only occur for those maintenance personnel trying to fix the device, and in these cases, the transmitter would likely be turned off.

A separate source of emissions to be considered for the DSRC system is an active transponder or tag installed on the vehicle which responds to the interrogation of the DSRC transmitter. The emissions from the Japanese standard for this device is 10 mW EIRP, so that ranges of at least 0.17 cm would be necessary to meet the FCC OET Bulletin 65 guidelines. Under normal circumstances these devices will be windshield-mounted, and hence would be typically 20 to 30 cm away from the driver or passenger. It should be noted that no standards decisions concerning the use of active tags has been made in the US, and should the final US standard not support active tags, these numbers would be moot.

One other case must be examined. That is exposure to multiple transmitters. This could happen in the case of a toll booth operator at a toll area which has multiple lanes with DSRC transmitters installed. The total exposure limit from all the transmitters must not exceed the MPE limit. Even considering this scenario, it would take 3,289 of the lower powered transmitters or 328 of the high powered transmitters, all located 5 m away (it is unlikely that all transmitters will be this close) from the toll booth operator, to reach the MPE threshold. This density of transmitters is very unlikely if not infeasible.

Conclusion: The expected deployment of DSRC beacons meets the FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields.

### **CERTIFICATE OF SERVICE**

I, Robert B. Kelly, do hereby certify that copies of the foregoing Reply Comments in RM-9096 were served this 17<sup>th</sup> day of September, 1997 via U.S. mail, first-class, postage paid, to the following:

Thomas L. Osborne  
Executive Secretary  
Maryland Transportation Authority  
303 Authority Drive  
Baltimore, MD 21222

Lucinda Grant  
Director  
Electrical Sensitivity Network  
PO Box 4146  
Prescott, AZ 86302

William B. Barfield  
Jim O. Llewellyn  
BellSouth Corporation  
1155 Peachtree Street, NE  
Suite 1800  
Atlanta, GA 30309-2641

David G. Frolio  
BellSouth Corporation  
1133 21<sup>st</sup> Street, N.W.  
Washington, D.C. 20036

George Y. Wheeler  
Koteen & Naftalin, L.L.P.  
1150 Connecticut Ave., NW  
Washington, D.C. 20036

#### **Counsel to Mark IV Industries, Ltd. IVHS Division**

Neil D. Schuster  
Executive Director  
International Bridge, Tunnel and Turnpike Association  
2120 L Street, NW  
Suite 305  
Washington, D.C. 20037

Carl W. Northrop  
E. Ashton Johnston  
Paul, Hastings, Janofsky & Walker LLP  
1299 Pennsylvania Avenue, N.W.  
10<sup>th</sup> Floor  
Washington, D.C. 20004-2400

**Counsel to ReSound Corporation**

John A. Prendergast  
Blooston, Mordkofsky, Jackson  
& Dickens  
2120 L Street, N.W.  
Suite 300  
Washington, D.C. 20037

**Counsel to Minnesota Mining and  
Manufacturing Company**

Edmund J. Ring  
Electronic Design Specialist  
3M Center, Mail Stop 235-3F-08  
St. Paul, Minnesota 55144

Vann H. Wilber  
American Automobile Manufacturers  
Association  
1401 H Street, N.W.  
Suite 900  
Washington, D.C. 20005

George F. Beronio  
U.S. Department of Transportation  
400 Seventh Street, S.W.  
Room 4102 C-30  
Washington, D.C. 20590

David C. Jatlow  
Young & Jatlow  
2300 N Street, N.W.  
Suite 600  
Washington, D.C. 20037

**Counsel to Saab Systems, Inc.**

Francis B. Francois  
Executive Director  
American Association of State Highway  
and Transportation Officials  
444 N. Capitol Street, N.W.  
Suite 249  
Washington, D.C. 20001

Edward Gross  
Executive Director  
New Jersey Turnpike Authority  
Administration Building  
PO Box 1121  
New Brunswick, New Jersey 08993

Thomas W. Brahms  
Executive Director  
Institute of Transportation Engineers  
525 School St., S.W.  
Suite 410  
Washington, D.C. 20024-2797

Marion L. Caldwell, Jr., P.E.  
Vice President and Chief Engineer  
MTA Bridges and Tunnels  
Robert Moses Building  
Randall's Island  
New York, NY 10035-0035

Samuel F. Gagaro  
Director  
Minnesota Department of Transportation  
Office of Electronic Communications  
395 John Ireland Blvd.  
St. Paul, MN 55103

Christopher D. Imlay  
Booth Freret Imlay & Tepper, P.C.  
5101 Wisconsin Ave., N.W.  
Suite 307  
Washington, D.C. 20016

**Counsel to the American Radio Relay League, Inc.**

Laura J. Myers  
Larry Strawhorn  
Management Systems Council  
American Trucking Associations  
2200 Mill Road  
Alexandria, VA 22314

Arthur Firstenberg  
President  
Cellular Phone Taskforce  
PO Box 100404  
Vanderveer Station  
Brooklyn, NY 11210

Thomas Derenge  
Federal Communications Commission  
Office of Engineering and Technology  
Suite 420  
2000 M Street, N.W.  
Washington, D.C. 20554

Charles Iseman  
Federal Communications Commission  
Office of Engineering and Technology  
Suite 420  
2000 M Street, N.W.  
Washington, D.C. 20554

Julius Knapp  
Federal Communications Commission  
Office of Engineering and Technology  
Suite 420  
2000 M Street, N.W.  
Washington, D.C. 20554

  
Robert B. Kelly